



State of CERES



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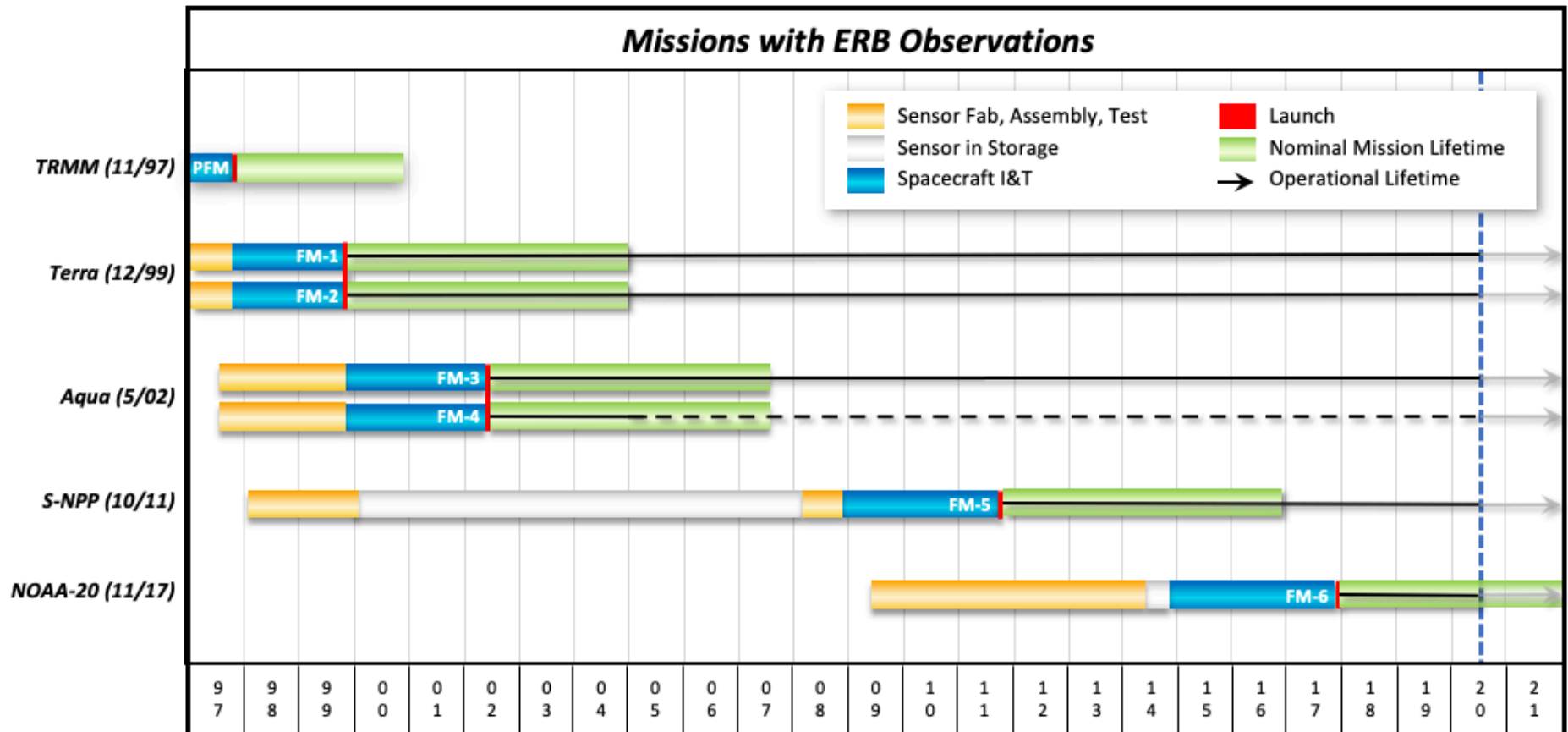
CERES Science Team Meeting, September 15-17, 2020
Virtual Meeting

CERES Meeting (Tuesday)

Review Status of CERES Instruments and Data Products:

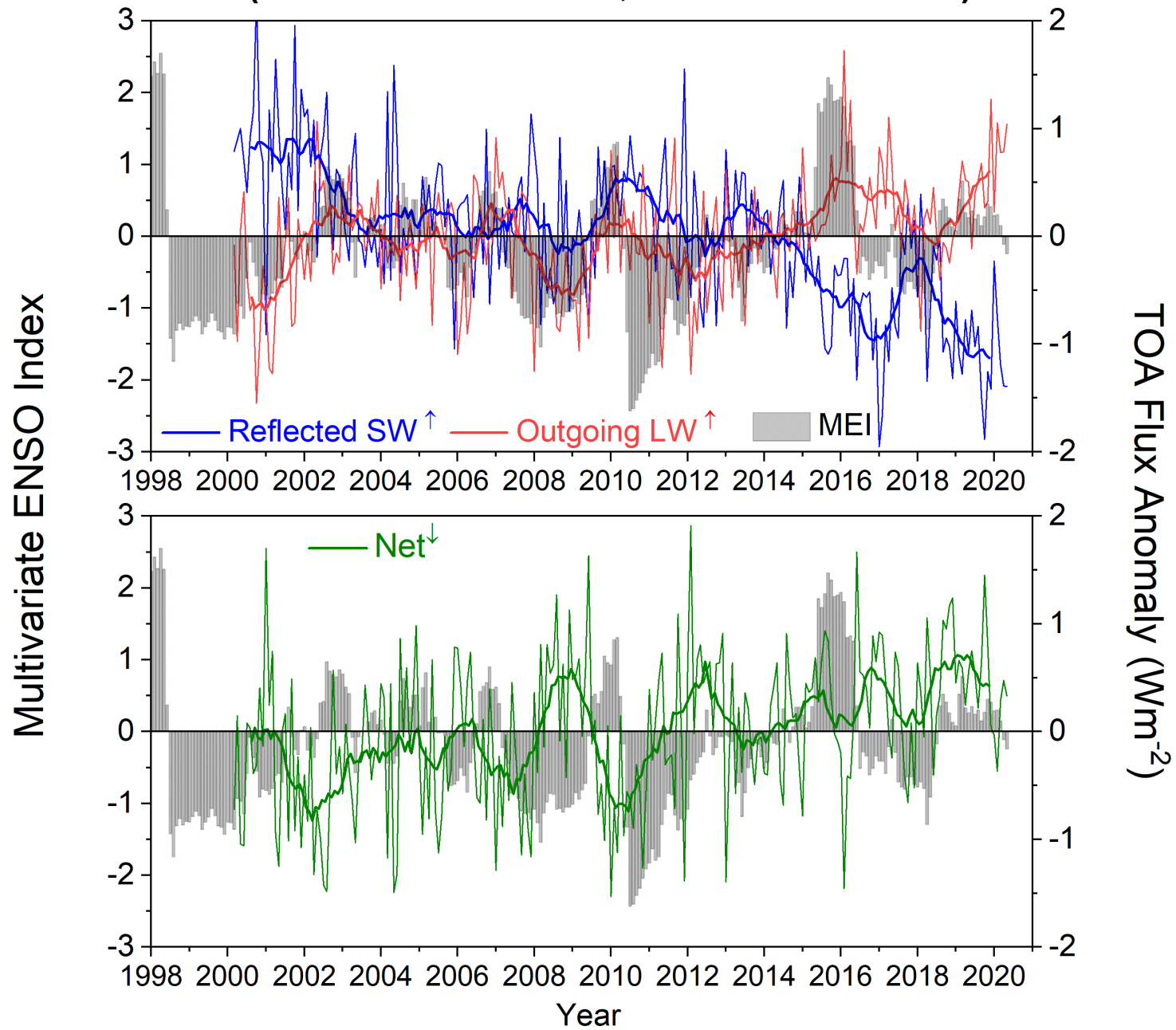
- State of CERES
- NASA HQ Update
- CERES Terra, Aqua, S-NPP, NOAA-20 Instrument Calibration Update
- MODIS & VIIRS Cloud Algorithm & Validation Status
- ADM, SARB and TISA Working Group Reports
- FLASHFlux Update
- Data Management Team Update
- Atmospheric Science Data Center (ASDC) Update
- Outreach Update – **CLOUD OBSERVER SKILL TEST!**

CERES Flight Schedules



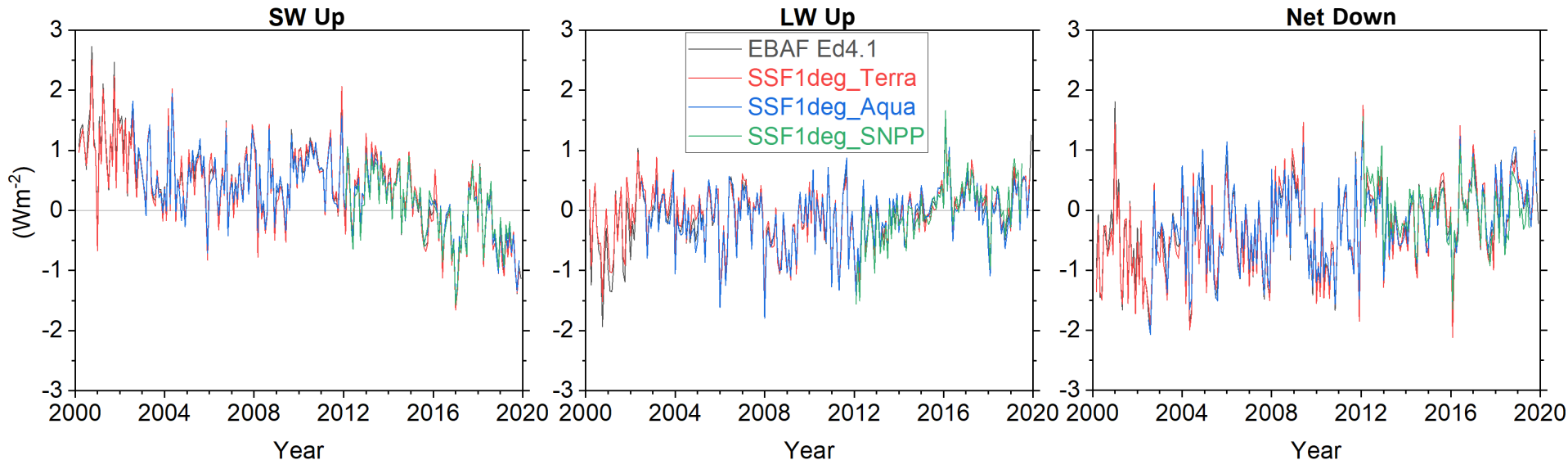
- Currently, 6 CERES instruments fly on 4 satellites: Terra (L1999), Aqua (L2002), S-NPP (L2011), NOAA-20 (L2017)
- Libera is scheduled to launch in 2027 aboard JPSS-3.

Global Mean All-Sky TOA Flux Anomalies & Multivariate ENSO Index (CERES EBAF Ed4.1; 03/2000 – 05/2020)



Global Mean TOA Flux Anomalies

(Relative to Climatology for 02/2012-09/2019)



EBAF Trends

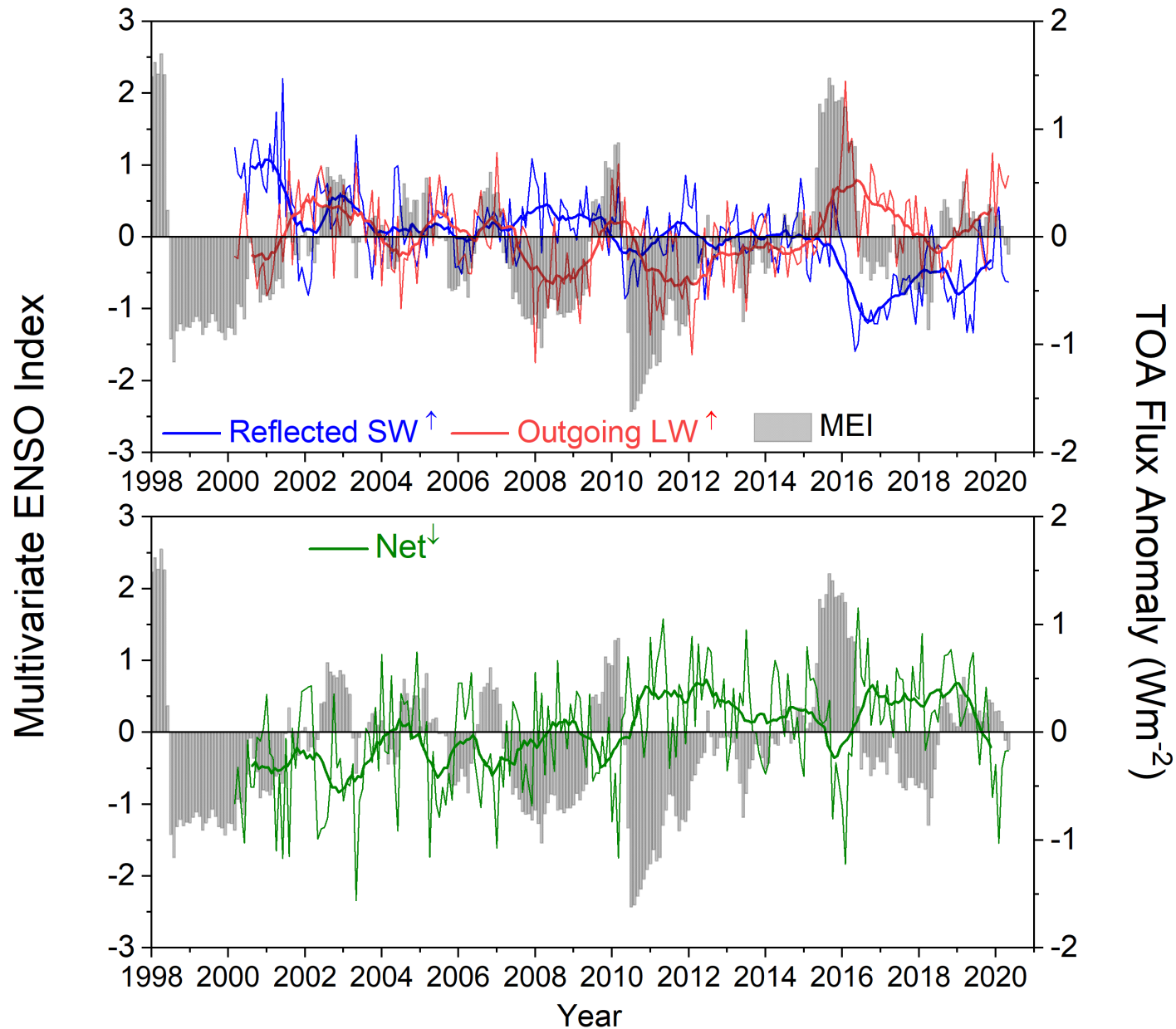
$-0.73 \pm 0.17 \text{ Wm}^{-2}$ per decade

$0.25 \pm 0.16 \text{ Wm}^{-2}$ per decade

$0.43 \pm 0.19 \text{ Wm}^{-2}$ per decade

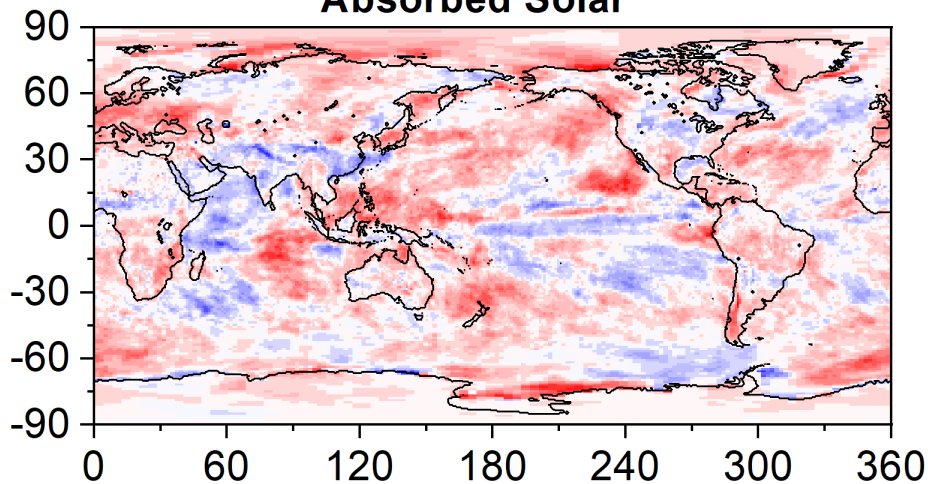
- RMS differences between Terra, Aqua and SNPP monthly anomalies for common period are: $< 0.2 \text{ Wm}^{-2}$ for SW and LW, and $< 0.25 \text{ Wm}^{-2}$ for net TOA flux.

Global Mean Clear-Sky TOA Flux Anomalies & Multivariate ENSO Index (CERES EBAF Ed4.1; 03/2000 – 05/2020)

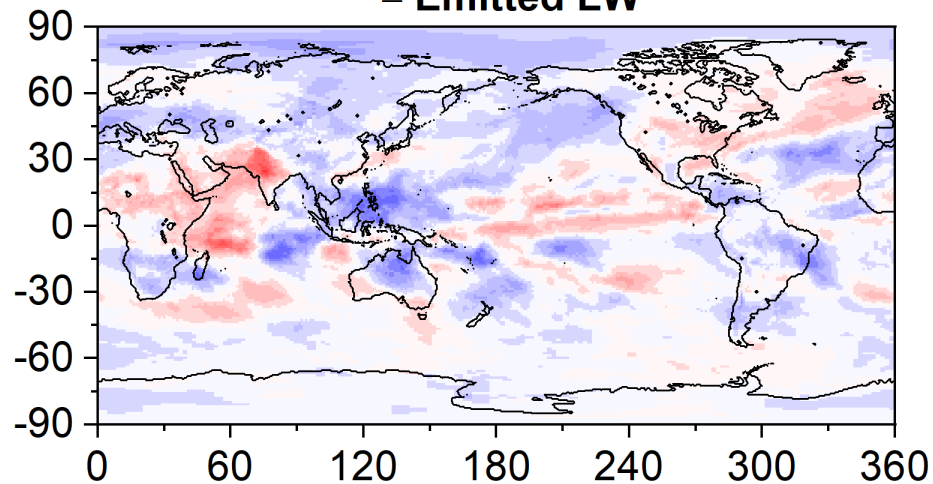


TOA Radiation Changes (03/2000 – 05/2020)

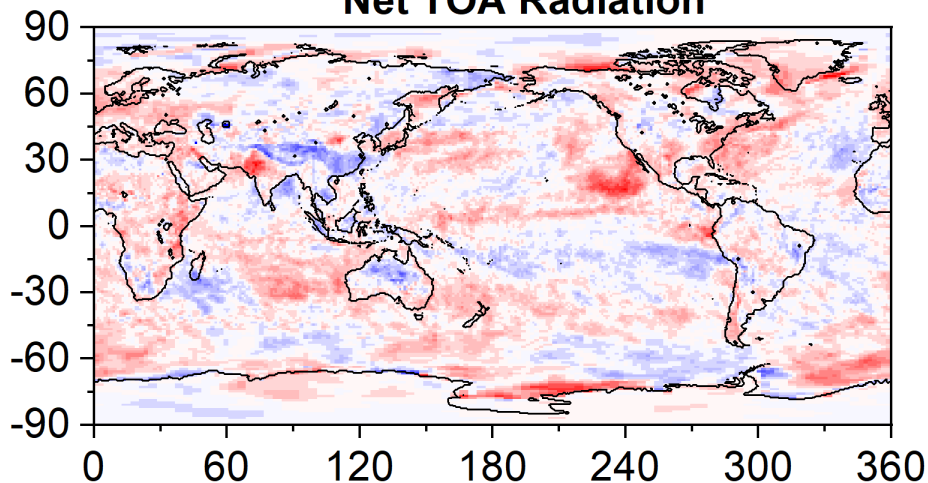
Absorbed Solar



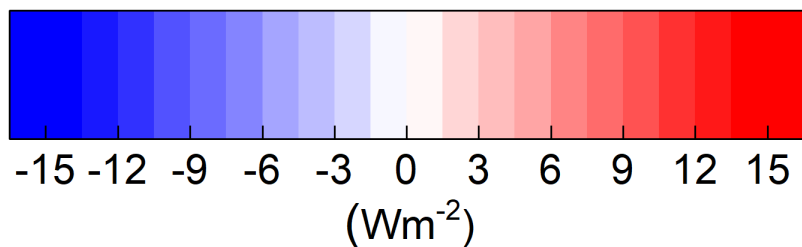
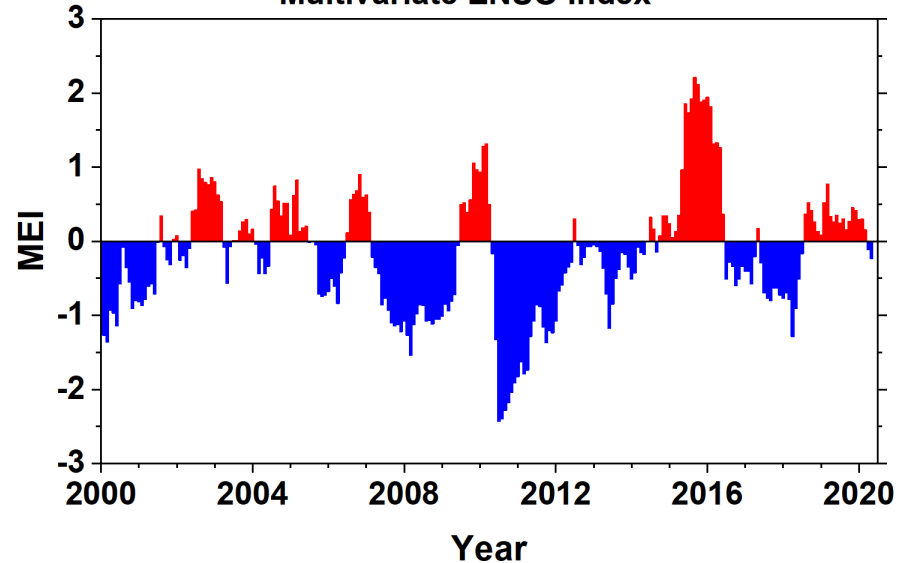
– Emitted LW



Net TOA Radiation

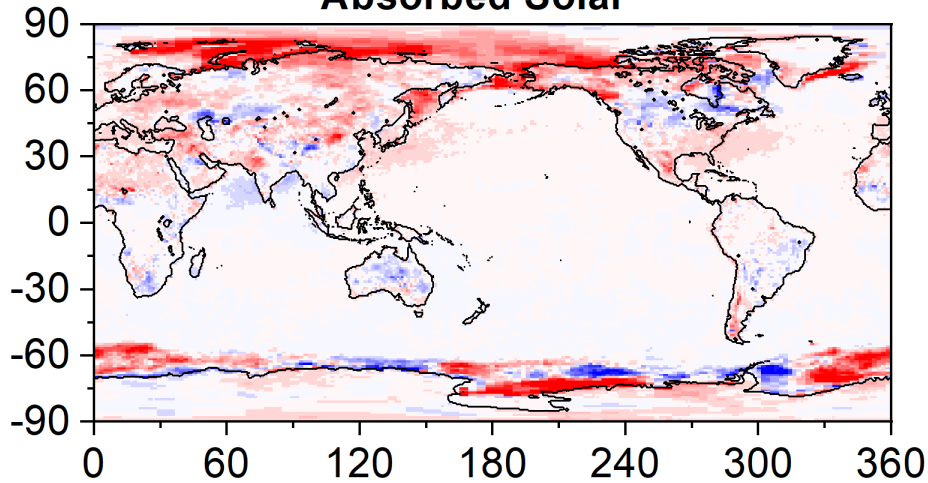


Multivariate ENSO Index

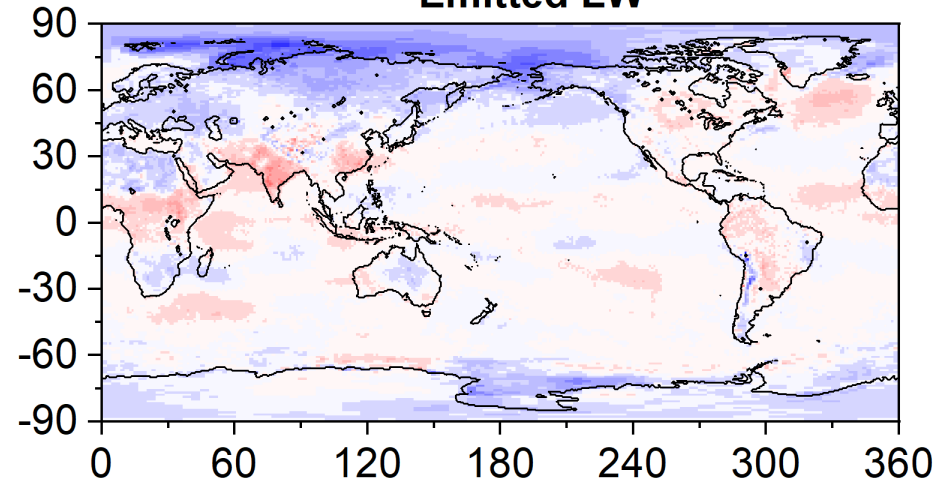


Clear-Sky TOA Radiation Changes (03/2000 – 05/2020)

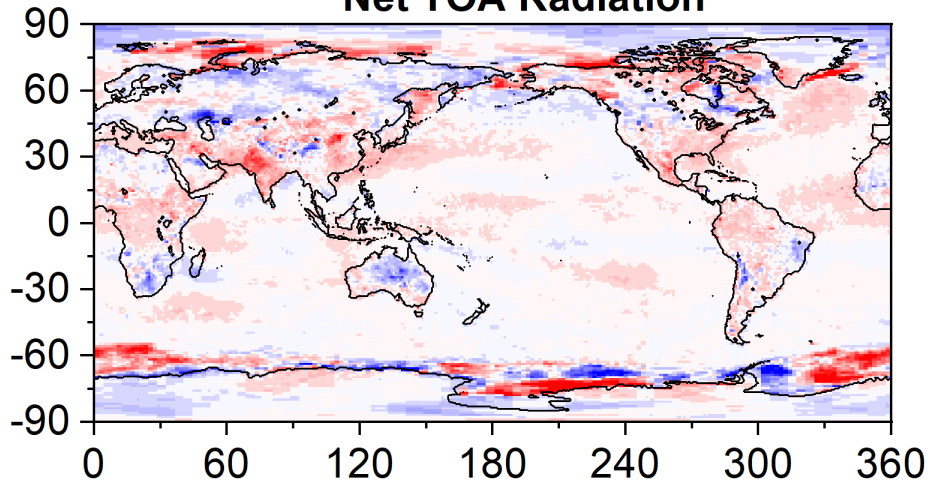
Absorbed Solar



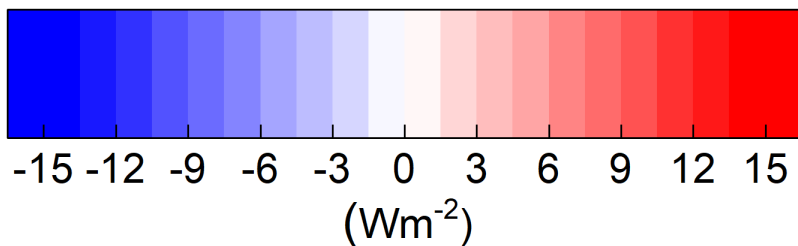
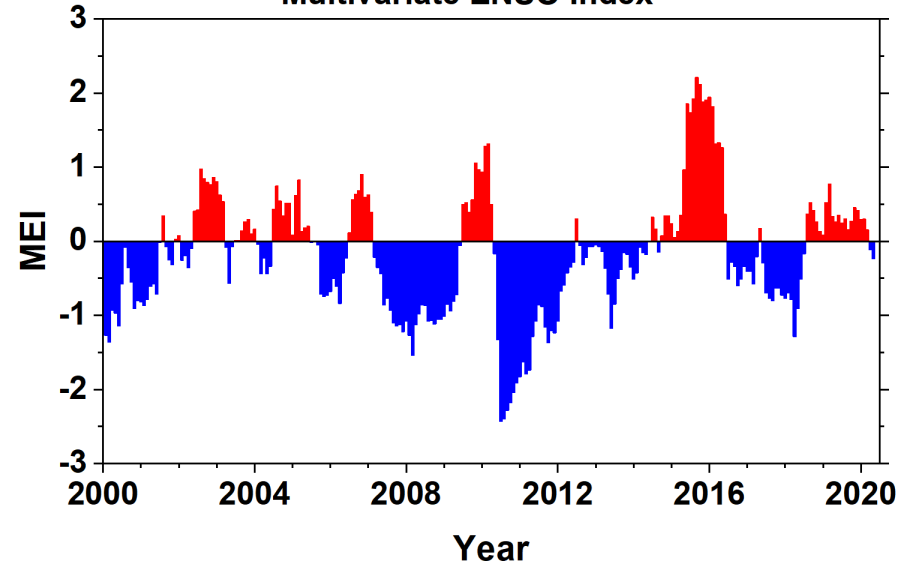
– Emitted LW



Net TOA Radiation



Multivariate ENSO Index



Aqua Solid State Recorder (SSR) Anomaly

DESCRIPTION OF EVENT: On August 16, 2020 at 09:26:40 UTC, the Aqua Command and Data Handling subsystem's Formatter Multiplex Unit (FMU)/Solid State Recorder (SSR) began exhibiting anomalous behavior during playback operations.

All X-Band science data playback from the FMU/SSR were corrupted since the anomaly began. Spacecraft housekeeping data continued to be recorded and successfully transmitted to the ground via the S-Band data transmission system. The other spacecraft bus subsystems and instruments functioned nominally. Direct Broadcast (DB) data continued to transmit nominally.

CORRECTIVE ACTION: An Anomaly Resolution Team (ART) was assembled that included the Aqua Flight Operation Team (FOT), the spacecraft manufacturer (Northrop Grumman Space Systems), ESMO Management, the Aqua Mission Director and the Aqua Project Scientist.

After many meetings, they decided an FMU Soft Reset was the best course of action. This resulted in the successful recovery of the FMU/SSR.

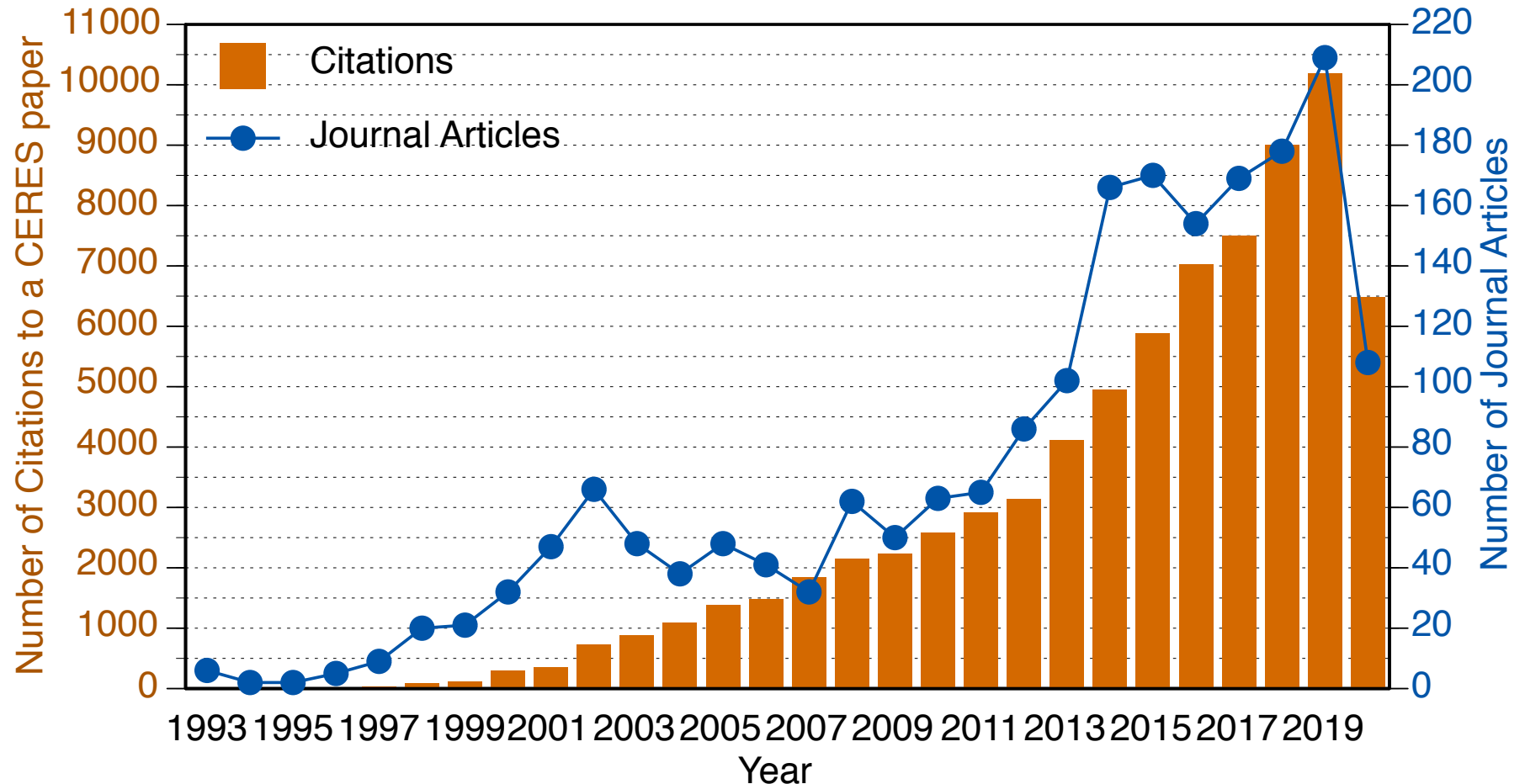
CERES was placed in safe mode during the anomaly.

Data loss: 08/16/2020 – 09/02/2020 (~17 days).

- CERES on NOAA-20 will be used to fill the data gap for SYN1deg and EBAF. This will require some code modifications for Clouds and EBAF subsystems.

CERES Journal Publications and Citation Counts

(For Papers Between 1993-2020; Updated September 8, 2020)



- Total number of peer-reviewed journal articles: 1,999
- Total number of citations to CERES papers: 75,876

(Compiled by Anne Wilber)

Number of Unique Users by CERES Data Product

(through August 31, 2020)

Level	Product	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1b	BDS	9	14	19	14	11	13	14	10	12	13
2	SSF	77	138	223	247	253	278	327	235	251	162
	FLASH_SSF	8	15	23	30	61	41	68	101	92	64
	C3M	32	33	37	28	55	54	49	49	36	25
	ES8	20	18	31	16	21	15	15	10	8	6
	SSF-MISR	4	2	5	4	2	1	3	1	1	3
3 & 3b	EBAF									256	379
	EBAF-TOA	160	346	484	579	580	540	646	668	629	432
	EBAF-Surface		147	289	375	424	464	510	484	386	62
	SYN1deg	168	199	353	382	438	494	607	639	754	585
	SSF1deg	126	107	157	166	160	194	190	159	221	139
	CldTypHist	12	37	57	41	40	47	86	87	79	53
	FluxByCldTyp										26
	ES4	36	11	27	19	13	12	17	17	17	7
	ES9	12	5	13	9	5	5	8	6	6	3
	FLASH_TISA	18	20	17	15	15	36	52	65	81	83

FLASHFlux via POWER (09/2019-08/2020): 82,100

CRAVE — CERES Radiation and Validation Experiments

GRANITE ISLAND

- No maintenance trip to Granite Island for LaRC team this year because of LaRC travel ban. BSRN instruments are very stable, so delaying a calibration swap this year should have no ill effects on the data.
- March 23 to May 22: "Michigan Stay at Home" orders for Upper Peninsula. Boats remain at docks.
- Aug 5: Our local contact finally made it to the island. Tasks accomplished:
 - Fixed solar tracker that had been broken since July 18.
 - Replaced AERONET, which had been working intermittently.
 - Performed miscellaneous cleaning and maintenance that LaRC team normally performs each Spring.

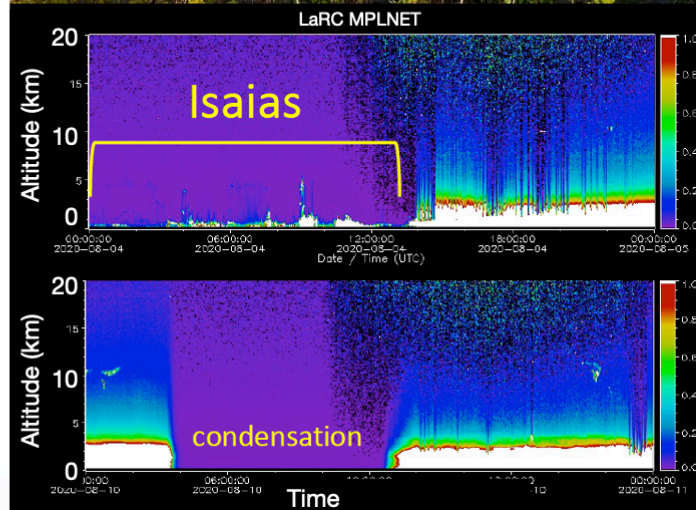
LaRC

- March 18: Mandatory telework begins at LaRC, limiting our access. Routine maintenance disallowed.
- June 10: Fred installed newly-repaired radar for MPLNET. System working.
- June 15: MPLNET computer malfunctions. Troubleshooting slow b/c of limited access to LaRC.
- July 16: Replaced MPLNET laptop. MPLNET working, but window has condensation almost daily.
- Aug 6: Installed auto-rinsing system for BSRN instruments, in anticipation of possible LaRC Stage 4 (and rare access again).
- Aug 13: Started supporting ACTIVATE overflights, which continue through September. Requires manual cleaning of MPLNET window.

COVE

- Moving COVE database to flat files to minimize maintenance.

GRANITE ISLAND



Other News

- NASA ESD 2020 Senior Review
 - Terra & Aqua proposals were submitted in March
 - Panel meeting was on July 9, 2020
- Release of new FluxByCldTyp1deg-day, -month product
- Resurrecting the Clouds Radiative Swath (CRS) Product
- Edition 2 S-NPP SSF & SSF1deg delayed due to delay in receiving new version of VIIRS radiances from GSFC.
- CERES FM5 (S-NPP) in full bi-axial (RAP) mode. CERES FM2 taking targeted PAP measurements over MOSAIC site.
- Effort underway to reduce latency of releasing CERES climate data products by slightly modifying CERES calibration protocol.
- Next CERES meeting: Spring 2021, Max-Planck-Institute for Meteorology, Hamburg, Germany (Joint with ScaRaB & GERB)???



CERES Science Team Meeting

TEST YOUR CLOUD OBSERVATION SKILLS!

1. Download the GLOBE Observer app to your mobile device
2. Select "Create an Account"
 - a. Enter the email you wish to use and select your country affiliation
 - b. Enter Referral Code: **GLIDSMU7** (*This will connect everyone to the same GLOBE Team*) and then select "Create Account"
 - c. An email will be sent to this address with a password to be used on the next screen
 - d. Enter the password
3. Select "GLOBE Clouds" to make a sky observation

Getting Started video: <https://www.youtube.com/watch?v=cZM3PO5hoHU>



This slide is available at:
CERES Homepage + News and Outreach + CERES STMs + CLOUD OBSERVER SKILL TEST